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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/657,207

09/09/2003

Hiroomi Tsutae

FUJI 136

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01/22/2009

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WASHINGTON, DC 20005

EXAMINER

AU, BAC H

ART UNIT

PAPER NUMBER

2822

MAIL DATE

DELIVERY MODE

01/22/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/657,207 | TSUTAE, HIROOMI | |
| | Examiner | Art Unit | |
| | Bac H. Au | 2822 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 4-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 18 and 19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment dated October 29, 2008, in which claim 1 was amended has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai (U.S. Pat. 6261977) in view of Smith (U.S. Pub. 2004/0221869).

Regarding claims 1-3, Tsai [Fig.3] discloses a process of cleaning a semiconductor manufacturing system having a reaction chamber and a substrate-supporting electrode provided inside the reaction chamber, a substrate being located on the substrate-supporting electrode when forming a semiconductor film on the substrate, the process comprising:

positioning an insulating cover [26] on the substrate-supporting electrode [21] in tight contact with the substrate-supporting electrode; and

supplying a fluoride-based cleaning gas into the reaction chamber and generating a plasma in the reaction chamber [Col.3 lines 17-31];

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wherein the fluoride-based cleaning gas is one of NF_3 , CF_4 , C_3F_8 , C_2F_6 , and ClF_3 [Col.3 lines 17-31];

wherein the positioning of the insulating cover in tight contact with the substrate-supporting electrode comprises placing the insulating cover [26] on the substrate-supporting electrode [21], and applying a voltage to the substrate-supporting electrode [Col.3 lines 17-31].

Tsai fails to explicitly disclose supplying an H_2 -based cleaning gas into the reaction chamber and generating another plasma in the reaction chamber. However, Smith [Paras.3-5, 27-30] discloses a method comprising supplying an H_2 -based cleaning gas into the reaction chamber and generating another plasma in the reaction chamber. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Smith into the method of Tsai to include supplying an H_2 -based cleaning gas into the reaction chamber and generating another plasma in the reaction chamber. The ordinary artisan would have been motivated to modify Tsai in the manner set forth above for at least the purpose of restoring the reaction chamber performance by removing from the chamber the residues resulting from the preceding plasma cleaning process [Smith; para.28].

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Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai (U.S. Pat. 6261977) in view of Smith (U.S. Pub. 2004/0221869), as applied to claim 1, and further in view of Fujisato (U.S. Pub. 2003/0119328).

Regarding claim 18, Tsai [Fig.3; col.1 lines 12-17] discloses a method of manufacturing a semiconductor device comprising:

- carrying out a cleaning process according to any one of claims 1 [Discussed above];

- setting the substrate on the substrate-supporting electrode in the reaction chamber;

- supplying a raw material gas into the reaction chamber; and

- generating a plasma to form a semiconductor film on the substrate [These limitations are inherently disclosed by Tsai in col.1 lines 12-17].

Alternatively, Fujisato [Paras.102-109] more clearly discloses a method comprising:

- carrying out a cleaning process according to claim 1;

- setting the substrate on the substrate-supporting electrode in the reaction chamber;

- supplying a raw material gas into the reaction chamber; and

- generating a plasma to form a semiconductor film on the substrate.

Because both references teach methods of deposition of films and cleaning of the plasma deposition apparatus, it would have been obvious to one skilled in the art to

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substitute one method for the other to achieve the predictable results of having an effective film forming process and an effective plasma system cleaning process.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai (U.S. Pat. 6261977) in view of Smith (U.S. Pub. 2004/0221869), as applied to claim 1, and further in view of Jurgensen (U.S. Pat. 6852243).

Regarding claim 19, Tsai [Figs.2-3; col.3 line 17 – col.4 line 8] discloses positioning of the insulating cover in tight contact with the substrate-supporting electrode by applying a voltage to the substrate-supporting electrode. Tsai fails to disclose wherein the positioning of the insulating cover in tight contact with the substrate-supporting electrode comprises placing the insulating cover on the substrate-supporting electrode, and clamping the insulating cover to the substrate-supporting electrode by a mechanical element. However, Jurgensen [Col.9 lines 12-24] discloses wherein the positioning of a cover in tight contact with the substrate-supporting electrode comprises placing the cover on the substrate-supporting electrode, and clamping the cover to the substrate-supporting electrode by a mechanical element. Jurgensen makes obvious the suitable alternatives of clamping by a mechanical element and by applying electrostatic force. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Jurgensen into the method of Tsai to include wherein the positioning of the insulating cover in tight contact with the substrate-supporting electrode comprises placing the insulating cover on the substrate-supporting electrode, and clamping the insulating

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cover to the substrate-supporting electrode by a mechanical element. The ordinary artisan would have been motivated to look to analogous art teaching alternative suitable or useful methods of performing the disclosed steps set forth above. Art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

Response to Arguments

3. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. Overall, Applicant's arguments are not persuasive. The claims stand rejected and the Action is made Final.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References Turner (U.S. Pat. 6534423) and Doi (U.S. Pat. 5900161) disclose using a hydrogen plasma cleaning step to remove residues left in the reaction chamber from a fluoride-based plasma cleaning.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bac H. Au whose telephone number is 571-272-8795. The examiner can normally be reached on Mon-Fri 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. H. A./
Examiner, Art Unit 2822

/Kevin M. Picardat/
Primary Examiner, Art Unit 2822